REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AN	D DATES COVERED		
1. Addition of other (Leave bloom)	Aug-99		Final Report: 3 Feb 98 thru 30 Jun 98		
4. TITLE AND SUBTITLE	<u> </u>		5. FUNDING NUMBERS		
Systems Engineering Analysis of the MPIM/S	RAW Program				
6. AUTHOR(S)					
Gary A. Maddux					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)			8. PERFORMING ORGANIZATION REPORT NUMBER		
Univ. of Alabama in Huntsville Huntsville, AL 35899			5-20066		
Uniiraniiie' VIC 22022			·		
9. SPONSORING/MONITORING AGENCY	NAME(S) AND ADDRESS(ES)		10. SPONSORING/MONITORING AGENCY REPORT NUMBER		
AMSAM-RD-SE-IO (D. JOHNSTON) U.S. Army Aviation & Missile Command Redstone Arsenal, AL 35898					
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION / AVAILABILITY STAT	EMENT		12b. DISTRIBUTION CODE		
Approved for Public Release; Distribution is	unlimited.		А		
13. ABSTRACT (Maximum 200 words)			I		
The Industrial Operations Division (IOD), SEPD management and engineering analysis as they management and engineering analysis ensures incorporated only after a systematic technical exconducted. This systems engineering analysis change, to include impacts on the manufactural system. In order to fulfill its mission, the IOD received.	relate to AMCOM supported weapon's that weapon system design and progravaluation and review of the total impact evaluates the long-term life cycle cons bility maintainability and supportability.	rystems. This rammatic changes are to the change is equences of the of the overall weapon			

19991004 023

14. SUBJECT TERMS			15. NUMBER OF PAGES
obsolescence, MPIM/SRAW			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT

PLEASE CHECK THE APPROPRIATE BLOCK BELOW

DA	
	copies are being forwarded. Indicate whether Statement A, B, C, D, E, F, or X applies.
风	DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED
	DISTRIBUTION STATEMENT B: DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES ONLY; (indicate Reason and Date). OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).
	DISTRIBUTION STATEMENT C: DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND THEIR CONTRACTS (Indicate Reason and Date). OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).
	DISTRIBUTION STATEMENT D: DISTRIBUTION AUTHORIZED TO DoD AND U.S. DoD CONTRACTORS ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).
	DISTRIBUTION STATEMENT E: DISTRIBUTION AUTHORIZED TO DoD COMPONENTS ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).
	DISTRIBUTION STATEMENT F: FUTHER DISSEMINATION ONLY AS DIRECTED BY (Indicate Controlling DoD Office and Date) or HIGHER DoD AUTHORITY.
	DISTRIBUTION STATEMENT X: DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND PRIVATE INDIVIDUALS OR ENTERPRISES ELIGIBLE TO OBTAIN EXPORT-CONTROLLED TECHNICAL DATA IN ACCORDANCE WITH Dod DIRECTIVE 5230.25. WITHHOLDING OF UNCLASSIFIED TECHNICAL DATA FROM PUBLIC DISCLOSURE, 6 Nov 1984 (indicate date of determination). CONTROLLING Dod OFFICE IS (Indicate Controlling Dod Office).
	This document was previously forwarded to DTIC on (date) and the AD number is
	In accordance with provisions of DoD instructions. The document requested is not supplied because:
	It will be published at a later date. (Enter approximate date, if known).
	Other. (Give Reason)
Dol stat	Directive 5230.24, "Distribution Statements on Technical Documents," 18 Mar 87, contains seven distribution ements, as described briefly above. Technical Documents must be assigned distribution statements.
	Print or Type Name
>	Jan a Madduy ZSG 890 6343 x ZZ Authorized Signature/Date ZSG 890 6343 x ZZ Telephone Number
/	Authorized Signature/Date Telephone Number

Technical Report 5-20066 Contract No. DAAH01-92-D-R006 Delivery Order No. 147

Systems Engineering Analysis of the MPIM/SRAW Program

(5-20066)

Final Technical Report for Period 3 February 98 through 30 June 1998

August 1999

Prepared by:

Gary A. Maddux

Systems Management & Production Lab The University of Alabama in Huntsville Huntsville, Alabama 35899

Prepared for:

U.S. Army Aviation & Missile Command Redstone Arsenal, AL 35898 Attn.: Mr. Doug Johnston

PREFACE

This technical report was prepared by the staff of the Research Institute, The University of Alabama in Huntsville. The purpose of this report is to provide documentation of the work performed and results obtained under Delivery Order 147 of AMCOM Contract No. DAAH01-92-D-R006. Mr. Robert Harvey and Mr. Gary Maddux were the principal investigators. Mr. George Wandler of UAH served as lead engineer. Mr. Doug Johnston, Industrial Operations Division, Systems Engineering and Production Directorate, Research, Development, and Engineering Center, U.S. Army Aviation & Missile Command, provided technical coordination.

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other official documentation.

Except as provided by the Contract Data Requirements List DD Form 1423, hereof, the distribution of any contract report in any state of development or completion is prohibited without the approval of the Contracting Officer.

Prepared for: Commander

U.S. Army Aviation & Missile Command

Redstone Arsenal, AL 35898

I have reviewed this report, dated <u>August 1999</u> and the report contains no classified information.

Principal Investigator

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	OBJECTIVES	1
3.0	STATEMENT OF WORK	1
4.0	ASSESSMENT OF MPIM/SRAW SYSTEM	2
5.0	CONCLUSIONS AND RECOMMENDATIONS	2

1.0 Introduction

The Systems Engineering and Production Directorate (SEPD), Research, Development and Engineering Center (RDEC) at the U.S. Army Aviation and Missile Command (AMCOM) has an engineering support contract with the University of Alabama in Huntsville. The scope of this contract provides for activities in systems engineering and manufacturing technology. The Industrial Operations Division (IOD), SEPD has the mission and function of providing technical management and engineering analysis as they relate to AMCOM supported weapon systems. This management and engineering analysis ensures that weapon system design and programmatic changes are incorporated only after a systematic technical evaluation and review of the total impact of the change is conducted. This systems engineering analysis evaluates the long-term life cycle consequences of the change, to include impacts on the manufacturability, maintainability and supportability of the overall weapon system. In order to fulfill its mission, the IOD required support in analysis of the MPIM/SRAW Program.

2.0 Objective

The objective of this task was to provide system engineering and perform systems engineering analysis of the MPIM/SRAW Program and formulate recommendations that can be used to lower life cycle costs (LCC) and improve the maintainability and reliability of future systems.

3.0 Statement of Work

The statement of work, as outlined in delivery order 147, was as follows:

UAH shall analyze the availability of microelectronic parts used in the MPIM/SRAW weapon system. The analyses shall be for microelectronics specifically identified by the IOD. UAH shall assess the health of the present configuration in terms of availability, and recommend solutions to non-availability problems. Solutions shall be presented with sufficient documentation to justify design change considerations. UAH shall not only present solutions that are unique to MPIM/SRAW, but shall also utilize solutions that have been developed for other weapon systems within the Army and DoD when applicable. This analyses shall involve the use of government furnished databases and other automated tools such as the Enhanced Microcircuit Obsolescence Analysis Tool (E-MOAT), TACHTech, and IHS Caps Expert. Other sources of information from other project offices, other commands, and the electronics industry shall be used as required.

UAH shall provide system engineering and technical support to the MPIM/SRAW system engineer. UAH shall ensure that the progress reports are developed, tracked, and collected for all test activities. UAH shall assist the MPIM/SRAW

system engineer in coordinating and resolving system engineering problems associated with management of the MPIM/SRAW program.

UAH shall provide technical support in tracking the progress and monitoring problems associated with the MPIM/SRAW production facility transition from China Lake, CA to Troy, AL. UAH shall provide systems engineering analysis of potential manufacturing problems involved with setting up the new facility, and make recommendations as appropriate.

4.0 Assessment of the MPIM/SRAW System

Under this task members of the UAH Systems Management and Production Lab performed a detailed engineering analysis on the component parts of the MPIM/SRAW weapon system. Specifically, microelectronic components were analyzed according to their availability and expected life cycle. To ascertain this information, UAH worked with the electronics industry, the MPIM/SRAW Project Office, and other government agencies. UAH also worked closely with the MPIM/SRAW systems engineer to resolve design problems as they arose.

UAH provided technical support by monitoring the production problems reported during the MPIM/SRAW transition between facilities. The results of these task efforts were published and delivered to IOD under separate cover.

5.0 Conclusion and Recommendations

During the time frame allocated by the delivery order, members of the UAH Systems Management and Production Lab, with the cooperation of representatives from AMCOM Systems Engineering and Production Directorate and the MPIM/SRAW Project Office investigated the life cycle supportability of the microelectronics of the MPIM/SRAW weapon system. Because of the rapidly changing microelectronics industry, it is imperative that this assessment be refreshed on a periodic basis. Only through the diligent monitoring of a complex system can its sustainability issues be properly addressed. It is recommended that the MPIM/SRAW weapon system adopt a proactive obsolescence management philosophy so that the total cost of ownership is reduced over the system's life cycle.